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which is one of the classics of natural history. In "turbinate" shells we are no longer dealing with a plane spiral as in the nautilus but with a gauche spiral on a right circular cone cutting the generators at a constant angle and such that along a generator the line-segments between successive whorls form a geometric progression.[1] For mathematical and other details of Moseley's work as well as of that of many others, on univalve and bivalve shells, Thompson's book, with its many exact references to the literature of the subject, should be consulted. One notable work which Thompson appears to have overlooked is Haton de la Goupillière, "Surfaces Nautiloïdes." [2]

In the field of leaf arrangement or phyllotaxis discussion of the theories of A. H. Church[3] and Cook evolved from observations of arrangements in logarithmic spirals of florets of sunflowers, pine cones, and other growths, should be read in connection with Thompson's criticisms. The fine sunflower photograph by H. Brocard[4] ought to be compared with those by Church.

NOTES AND NEWS.

Edited by D. A. Rothrock, Indiana University, Bloomington, Indiana.

Assistant Professor H. M. Showman, of Colorado School of Mines, has been promoted to a professorship of mechanics and engineering.

Assistant Professor S. T. Sanders has been made head of the department of mathematics at Louisiana State University, and Dr. I. C. Nichols has been appointed associate professor of mathematics.

Assistant Professor L. P. Siceloff, of the department of mathematics of Columbia University, has entered the Y. M. C. A. service, and will shortly embark for France.

Professor J. L. Coolidge, of Harvard University, has received a commission as major in the Ordnance Department of the National Army and is in active service. Dr. L. R. Ford, instructor in actuarial mathematics, has also entered the military service.

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[1] As early as 1701 Guido Grandi showed that the orthogonal projection of this spiral on a plane perpendicular to the axis of the cone is a logarithmic spiral. The gauche spiral has been studied by Th. Olivier (who called it the conical logarithmic spiral), *Developpements de géométrie descriptive*, 1843, pp. 56–76; by P. Serret, *Théorie nouvelle géométrique et mécanique des lignes à double courbure*, 1860, p. 101; etc. A number of results are collected by Gomes Teixiera, *l. c.*, pp. 396–400.

For other surfaces involving the logarithmic spirals reference should be given to the very interesting pages 232–313 of G. Holzmüller, *Elemente der Stereometrie*, Dritter Teil, Leipzig, Göschen, 1902, on logarithmic spiral tubular surfaces and their inverses.

[2] This occupies almost the whole of the third volume of *Annaes scientificos da academia polytechnica do Porto*, Coïmbra, 1908. *Cf. L'Intermédiaire des mathématiciens*, 1900, tome 7, p. 40; tome 8, pp. 167, 314; tome 17, p. 155.

[3] A. H. Church, *On the Relation of Phyllotaxis to Mechanical Law*, London, Williams and Norgate, 1904.

[4] In *L'Intermédiaire des mathématiciens*, 1909, and in H. A. Naber, *Das Theorem des Pythagoras*, Haarlem, Visser, 1908, opposite p. 80.

Mr. R. A. HARRIS, for twenty-eight years mathematician to the Coast and Geodetic Survey, died on January 17, 1918, at the age of fifty-four years.

The Rev. A. T. G. APPLE, for the past eleven years professor of mathematics and astronomy in Franklin and Marshall College, died on February 5, at the age of fifty-eight years.

Dr. CHRISTIAN HORNUNG, for many years professor of mathematics at Heidelberg University, Tiffin, Ohio, and a charter member of the Association, died on January 31, 1918, aged seventy-three years. Following Professor Hornung's death, Mr. H. L. OLSON was appointed instructor in mathematics.

During the absence of Director R. H. CHITTENDEN, of the Sheffield Scientific School, who has gone to Europe on an important Government Commission, Professor P. F. SMITH, of the department of mathematics, will be acting director.

The *Colorado College Publications*, issued in November, 1917, contains a valuable historical paper on "Newton's solution of numerical equations by means of slide rules," by Professor F. CAJORI, former president of the Association.

UNIVERSITY OF ILLINOIS. Summer Session, June 18 to August 9.—By Professor SISAM: Differential geometry, Solid analytic geometry.—By Professor SHAW: Vector methods, Differential equations.—By Dr. KEMPNER: Advanced algebra. The usual elementary courses are also offered.

INDIANA UNIVERSITY. Summer Session, June 18 to August 9.—By Professor DAVISSON: Non-Euclidean geometry, Mathematical theory of investment.—By Professor ROTHROCK: Advanced integral calculus, Analytical and spherical trigonometry.—By Professor HANNA: Differential equations, Calculus. The usual elementary courses in college algebra, trigonometry and analytic geometry will also be offered.

At the Summer Session of the University of Colorado work in mathematics will be offered by Professor G. H. LIGHT, Professor B. F. FINKEL, of Drury College, and Professor A. COHEN, of Johns Hopkins University. Courses are offered in the elementary mathematics, teachers' course, calculus, differential equations, least squares, Fourier series, projective geometry, differential geometry, Galois' theory of equations, and definite integrals.

UNIVERSITY OF WISCONSIN. Summer Session.—By Professor E. B. VAN VLECK: Linear substitutions, Survey of elementary mathematics, and Analytical geometry.—By Professor E. B. SKINNER: Theory of surfaces and twisted curves (3 hrs.), The teaching of secondary mathematics (5 hrs.), and Algebra.—By Professor H. W. MARCH: Theory of probabilities (3 hrs.), Mechanics (5 hrs.), Calculus (5 hrs.).—By Dr. T. M. SIMPSON: Equations of third and higher degrees (3 hrs.), Integral calculus (12 hrs.).—By Mr. MOORE: Differential equations (5 hrs.), Trigonometry, and Solid geometry.

THE UNIVERSITY OF CHICAGO. Summer Quarter, June 17–August 31, 1918. —By Professor E. H. MOORE: Differential equations in general analysis (first half), four hours, College algebra (first half), five hours.—By Professor G. A. BLISS: Calculus of variations, four hours, Higher plane curves, four hours.—

By Professor L. E. Dickson: Solution of numerical equations (first half), four hours, Determinants and symmetric functions (second half), four hours, Algebraic invariants, four hours.—By Professor H. E. Slaught: Definite integrals, four hours, Integral calculus, four hours.—By Professor A. C. Lunn: Units and dimensions, four hours, Electromagnetic theory, four hours.—By Professor J. W. A. Young: Topics in geometry, four hours, Plane analytic geometry, five hours.—By Professor R. G. D. Richardson (Brown University): Theory of functions of a complex variable, four hours, Differential calculus, five hours.—By Professor W. H. Roever (Washington University, St. Louis): Descriptive geometry, five hours, Plane trigonometry, five hours.—By Professor G. W. Myers: The teaching of secondary mathematics, School of Education, five hours.

At the meeting of the North Carolina Association of Teachers of Secondary Mathematics, held at Greensboro, February 1 and 2, addresses were made by Professor D. E. Smith, of Columbia University, on "The origin of mathematics," on "Deficiencies in present preparatory mathematics," and a round-table discussion on "A proper approach to elementary mathematics." Papers were also presented by Miss Fannie S. Mitchell, of the Raleigh High School, by Miss Virginia Ragsdale, of Normal College, by Miss Ella Bradley, of the Gastonia High School, and by Mr. J. W. Lasley, of the University of North Carolina.

The annual Register of the Officers and Members of the American Mathematical Society appeared in January, showing the total membership of the Society to be 735, exactly the membership on January 1, 1917. During the year 1917, there were 29 persons admitted to membership, and also 29 withdrawals. Twenty-five members of the Society are reported as being in some form of government service connected with the war. The membership extends to every state of the Union except Delaware, Louisiana and South Carolina. There are 57 foreign members, of whom 46 reside in the British Empire.

Professor C. N. Moore, University of Cincinnati, has been appointed a member of the National Committee on Mathematical Requirements in place of Professor O. Veblen, who has resigned on account of his duties in connection with government service.

The Mathematics Club of Chicago is a body of men who are teachers in the high schools of Chicago and neighboring towns, including also some teachers from Lewis Institute, Armour Institute, and the University of Chicago. They meet on the second Friday evening of each month for dinner at the City Club and spend the evening in discussions led by some chosen speaker. The Club has recently been addressed by Professors E. J. Wilczynski and H. E. Slaught. The April meeting will be addressed by Principal W. B. Owen, of the Chicago Normal College, who is chairman of the committee of the National Education Association that is charged with reviewing the reports of the various departmental committees working under the Commission on the Reorganization of the High School Curriculum.

The departments of Chemistry, Physics and Mathematics of the University of Chicago are uniting through their representatives to give some special courses in preparation for war service. Professor A. C. LUNN is the representative of the department of mathematics in this work. Professor F. R. MOULTON will also give during the Spring Quarter a special course of this kind. Professor Moulton is spending a part of the Winter Quarter in advisory service at Fort Sill, Texas.

The Mathematical Association of Great Britain held its annual meeting at the London Day Training College on January 9 and 10, 1918. Papers were presented by Dr. W. P. MILNE, on "Graphical treatment of power series"; by Mr. G. GOODWILL, on "Suggestions for presenting mathematics in closer touch with reality"; and the presidential address by Professor P. T. NUNN, on "Mathematics and individuality." The meeting was closed by a general discussion on the position of mathematics in the proposed new course of study for secondary schools. The *Mathematical Gazette*, edited by Professor W. G. GREENSTREET, is the official organ of the Association; it appears six times a year from the publishing house of G. Bell & Sons, London. A number of valuable reports have been issued by the Association during the past ten years; these are enumerated below, with the price of each as announced by the publishers: (1) Reports on the teaching of elementary mathematics (geometry, arithmetic and algebra, mechanics, advanced school mathematics, entrance scholarship mathematics, mathematics in preparatory schools) (6d. net); (2) Report on the teaching of elementary algebra and numerical trigonometry (3d. net); (3) Report on the teaching of mathematics in preparatory schools (3d. net); (4) Report on the correlation of mathematical and science teaching (6d. net); (5) A general mathematical syllabus for non-specialists in the public schools (2d. net); and (6) Elementary mathematics in girls' schools (1s. net).

The Council of the Mathematical Association of America has elected the following to membership, on applications duly certified:

To individual membership.

Rev. Peter Archer, S.J. Director, Georgetown Coll. Observ. and Prof. of Math., Georgetown Univ., Washington, D. C.

Sir George Greenhill, M.A. Formerly Prof. of Math., Artillery Coll., Woolwich, Eng. 1 Staple Inn, London, W. C., Eng.

Y. L. Hsia, Ph.D. (Berlin). Director, Science Dept., Government Univ., Peking, China.

Carroll Johnson Ramage, Ph.D. (Grove City Coll.). Lawyer, Saluda, S. C.

Clarence Cornelius Van Nuys, A.M. (Columbia), E.M. (S.D. School of Mines). Prof. of Physics, Col. School of Mines, Golden, Col.

Gilbert F. Winslow, Jr., B.S. in Min. Engg. (Ore. Agric. Coll.). Computer, Coast and Geodetic Survey, Washington, D. C.

To institutional membership.

Georgetown Univ., Washington, D. C.
Knox Coll., Galesburg, Ill.
Denison Univ., Granville, Ohio.

W. D. CAIRNS, *Secy.-Treas.*